REMARKS

Favorable reconsideration of this Application as presently amended and in light of the following discussion is respectfully requested.

After entry of the foregoing Amendment, Claims 1, 3-22 are pending in the present Application. Claims 1, 3, 4, 6, 9, 11, 13-15 and 19 have been amended. Support for the amendments can be found in the specification and claims, as originally filed. No new matter has been added.

The outstanding Official Action rejected Claims 1, 3-9 and 19 under 35 U.S.C. § 103 as unpatentable over Shearer (U.S. Publication 2003/0058826, hereinafter Shearer) in view of Palenius (U.S. Patent 6,904,290); Claims 10 and 11 stand rejected under 35 U.S.C. § 103 as being unpatentable over Shearer in view of Palenius and further in view of Haartsen (U.S. Patent No. 6,576,266); Claim 12 stands rejected under 35 U.S.C. § 103 as being unpatentable over Shearer in view of Palenius and in further view of Haartsen and in further view of Chari et al. (U.S. Patent 6,704,301, hereinafter Chari); Claims 13-18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Shearer in view of Palenius and further in view of Chari; and Claims 20-22 stand rejected under 35 U.S.C. § 103 as being unpatentable over Shearer in view of Palenius and in further view of Gibbons et al. (U.S. Patent Publication 2005/0136951, hereinafter Gibbons).

Applicants thank the Examiner for the courtesy of the interview extended to the Applicants' representative on January 11, 2007. During the interview, the rejections noted in the outstanding Official Action were discussed. However, no agreement was reached pending the Examiner's further review and a response as filed. Comments presented during the interview were reiterated below.

REJECTION UNDER 35 U.C.S. § 103

The Official Action has rejected Claims 1, 3-7 and 19 under 35 U.S.C. § 103 as being unpatentable over Shearer and Palenius. The Official Action contends that Shearer describes all the Applicants' claim features with the exception of a control signal having a lower bit rate than an information signal and a communication route of a control signal is independent of the communication route of the information signal. However, the Official Action cites Palenius as describing this more detailed aspect of the Applicants' claimed advancements, and states it would have been obvious to one of ordinary skill in the art at the time the advancements were made, to combine the cited references for arriving at the Applicants' claims. Applicants respectfully traverse the rejection.

Amended Claim 1 recites, *inter alia*, a multi-hop communication system having a radio control station, including:

> . . . a control signal transmission/reception unit configured to transmit/receive a control signal having a lower bit rate than the information signal of a same channel and for conducting communication with the radio station;
> an information signal transmission/reception unit configured to transmit/receive the information signal;
> a communication route determiner configured to determine a communication route for the control signal independently from a communication route for the information signal of the same channel, . . .

Shearer describes a multi-hop wireless local area network (WLAN) system. The WLAN (20) includes a hub access point (HAP) node (22) and active nodes (24) and inactive nodes (26). The WLAN is configured as a daughter network, which is coupled to a parent network (28), such as the internet.[1] Fig. 7 shows a high-level block diagram of a node used

[1] Shearer at paragraphs 41 through 42.

from the WLAN network. The node includes a processor (46), a transceiver (48), a memory (50), a timer (52), and a data port (54).[2]

In operation, the HAP schedules time slots (42) for active nodes along outward communication paths (34) and inward communication paths (36). Beginning time slots for the inward communication paths are assigned to outermost nodes (30). Likewise, beginning time slots for the outward communication paths are assigned to the hub access point node. In this manner, the transceiver (48) of an active node can transmit available communications during an assigned time slot. The processor (46) controls the transceiver by specifying a transmit/receive direction of operation, a channel over which to communicate and when to communicate, and when to commence transmitting and receiving.[3]

Palenius describes a cellular communication system in which a base station (100) communicates with a mobile station (110) via a cell (50). The cellular communication system operates using a CDMA technology having duplexed downlink and uplink channels.[4] The mobile station may have a different number of physical channels allocated to it in the downlink than in the uplink direction.[5] Channels such as DPCCH, DPDCH1 and DPDCH2 are controlled by a power level controller (29) such that the power level between the various channels are controlled in accordance with a power offset value received from the base station (100).[6] As noted at column 4 lines 32-44, Internet bandwidth may vary in the uplink and downlink directions of a connection and include different data transfer rates respectively.

Conversely, in an exemplary embodiment of the Applicants' claimed advancements, a multi-hop communications system is configured by a radio control station connected to a core network and a plurality of radio stations for relaying signals therebetween. The radio control

[2] Shearer at paragraph 63; Fig. 7.
[3] Shearer at paragraph 54;Abstract.
[4] See Palenius at column 4, lines 14-32.
[5] See Palenius at column 4, lines 35-38.
[6] See Palenius at column 5, lines 23-32.

station includes a control signal transmission/reception unit configured to transmit/receive a control signal having a lower bit rate than an information signal and for conducting communication with the plurality of radio stations. An information signal transmission/reception unit is configured to transmit/receive the information signal. A communication route determiner is configured to determine a communication route through the multi-hop communication system for the control signal independently from a communication route through the multi-hop communication system for the information signal. The radio station includes a control signal transmission/reception unit configured to transmit/receive the control signal. An information signal transmission/reception unit is configured to transmit/receive the information signal. Neither Shearer nor Palenius disclose or suggest a route determiner configured to determine a communication route through a multi-hop communication system for the control signal independently from a communication route through a multi-hop communication system for the information signal of the same channel in which a control signal is provided with a lower bit rate with respect to the information signal, as recited in Applicants' amended Claim 1 or any claim depending therefrom. Likewise, independent Claims 3, 9, and 19 recite substantially similar limitations to that discussed above; and, as such, these claims and any claims depending therefrom are likewise allowable over the cited references.

Accordingly, Applicants respectfully request that the rejection of Claim 1-9 and 19 under 35 U.S.C. § 103 be withdrawn.

The Official Action has rejected Claims 10 and 11 under 35 U.S.C. § 103 as being unpatentable over Shearer, Palenius and Haartsen. The Official Action states that Shearer and Palenius disclose all of the Applicants' claim features, with the exception of a communication route determiner, which transmits a usage inquiry to a radio station for

inquiring usage of a communication channel handled by the radio control station and transmitting/receiving the information signal according to a usage notification that is a response to the usage inquiry. The Official Action cites Haartsen as disclosing this more detailed aspect of the Applicants' advancements and states that it would have been obvious to one of ordinary skill in the art at the time the advancement was made to combine the cited references for arriving at the Applicants' claims. Applicants respectfully traverse the rejection.

As discussed above, Shearer and/or Palenius do not disclose or suggest all of the elements of the Applicants' amended claims for which they are asserted, as Haartsen does not remedy the deficiency discussed above, Applicants respectfully submit that a *prima facie* case of obviousness has not been established.

Accordingly, Applicants respectfully request that the rejection of Claims 10 and 11 under 35 U.S.C. § 103 be withdrawn.

The Official Action has rejected Claim 12 under 35 U.S.C. § 103 as being unpatentable over Shearer and Palenius in view of Haartsen and further in view of Chari. The Official Action asserts that Shearer, Palenius and Haartsen disclose all of the Applicants' claim features, with the exception of a radio station having a decision unit changing a threshold for the reception level according to a transmission speed of the information signal and deciding whether or not communication is directly conducted with the radio control station based on a result of comparison of the reception level and the threshold. The Official Action cites Chari as disclosing this more detailed aspect of the Applicants' claimed advancements and states that it would have been obvious to one of ordinary skill in the art at the time the advancements were made to combine the cited references for arriving at the Applicants' claims. Applicants respectfully traverse the rejection.

As discussed above, Shearer and/or Palenius do not suggest all of the elements of the Applicants' amended claims for which they are asserted, as neither Haartsen nor Chari does not remedy the deficiency discussed above, Applicants respectfully submit that a *prima facie* case of obviousness has not been established.

Further, Applicants note that the beacon, which is broadcast in Chari, simply provides a server address, which is propagated through a network based upon the quality of links which are traversed by the beacon. In other words, at some point, it no longer becomes feasible to propagate the beacon due to link quality factors.[7] The quality of the links between nodes on a network is clearly different from a threshold of a reception level of a control signal. Likewise, Applicants' Claim 12 recites changing the reception level of a control signal in accordance with a transmission speed of a separate signal, namely an information signal. There is no disclosure or suggestion in Chari for adjusting a reception level of one signal in accordance with the reception speed of a second signal. Thus, Claim 12 is allowable at least for these additional reasons.

Accordingly, Applicants respectfully request that the rejection of Claim 12 under 35 U.S.C. § 103 be withdrawn.

The Official Action has rejected Claims 13-18 under 35 U.S.C. § 103 as being unpatentable over Shearer and Palenius in view of Chari. The Official Action states that Shearer discloses all of the Applicants' claim features, with the exception of a first relay controller for transmitting a relay control signal to another station for requesting a relay of an information signal and setting up a communication route to the radio control station via another station according to a response relay control signal. The Official Action cites Chari as disclosing this more detailed aspect of the Applicants' claimed advancements and states

[7] Chari at column 3, lines 33-54.

that it would have been obvious to one of ordinary skill in the art at the time the advancement was made to combine the cited references for arriving at the Applicants' invention. Applicants respectfully traverse the rejection.

As discussed above, Shearer and/or Palenius do not suggest all of the elements of the Applicants' amended claims for which they are asserted, as Chari does not remedy the deficiency discussed above, Applicants respectfully submit that a *prima facie* case of obviousness has not been established.[8]

Accordingly, Applicants respectfully request that the rejection of Claims 13-18 under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that the present Application, including Claims 1 and 3-22, is patently distinguished over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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[8] Further, Applicants note that Chari is further deficient for the teachings for which it has been asserted as discussed at page 14 of this response.